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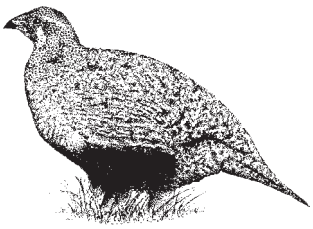
Greater Sage-Grouse Recovery Plan



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FISH AND WILDLIFE
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EXHIBIT 101.3

declined from the late 1800s to the early 1900s because of habitat conversion, overgrazing, and weak hunting regulations (Yocom 1956). Sage-grouse historically ranged from the Columbia River in Klickitat County, north to Oroville, west to the foothills of the Cascades, and east to the Spokane River (Fig. 2). As early as 1860, sage-grouse had declined and were rarely seen in some areas that formerly contained numerous birds. In 1897, the hunting season for sage-grouse extended from 15 August - 1 December, with a bag limit of 10 birds/day. By the early 1900s, sage-grouse had been extirpated from Spokane, Columbia, and Walla Walla counties and perhaps other counties that historically contained small populations. In 1922, the sage-grouse season was closed in all counties except Benton and Franklin counties, where the season was limited to 2-6 September with a daily bag of 3 birds. The season was closed in all counties in 1923 and remained closed statewide until 1950. Sage-grouse numbers increased in some areas with the change from horse-drawn to mechanized farming, and protection from hunting. Sage-grouse were apparently abundant enough to be causing damage to alfalfa and potatoes in the Badger Pocket area of Kittitas County where hunting resumed in 1950 (Yocum 1956). The recovery was temporary, however, as more and more shrub-steppe was converted to agriculture within the Columbia Basin Irrigation Project.

Declines and local extirpations of sage-grouse continued through the 1980s. The population declined an average of −0.76% /year from 1970-2003. Schroeder et al. (2000) estimated a decline of 77% between 1960 and 1999, but indicated that the estimate would be closer to 95% if an additional 16 leks for which there was no early count data were assumed to have been of average size in 1960 and were included in the estimate. The breeding population in Lincoln County was essentially eliminated by 1985 because of habitat alteration. The Badger Pocket area, southeast of Ellensburg in Kittitas County, historically supported large numbers of sage-grouse, but they were extirpated by 1987 due to conversion of shrub-steppe to cropland in the 1970's and 1980's. The sage-grouse population on the Fitzner and Eberhardt Arid Lands Ecology Reserve (ALE) unit of Hanford Reach National Monument (formerly part of the Department of Energy's Hanford site) in Benton County was evidently extirpated, probably due to catastrophic fires in 1981 and 1984. No sage-grouse populations have been found there in recent surveys, although individual birds are sighted on rare occasions. In the 20th century, the range of sage-grouse in Washington has declined by approximately 92%.

While habitat loss was probably the most important factor in the elimination of sage-grouse from most of their range in Washington, over-harvest may have exacerbated the impacts of habitat fragmentation and accelerated local extirpations. Recent management guidelines state that where sage-grouse populations are hunted, harvest rates should be 10% or less of the estimated fall population (Connelly et al. 2000b), although this recommendation was not based on research experiments. An accurate accounting of historical harvests is impossible. Harvests may have been over-estimated by up to 100% because estimates were based on surveys of ≤10% of hunters (Pedersen 1982). There is also uncertainty in the estimates of historical population sizes (Schroeder et al. 2000). Fall populations may have been significantly higher, perhaps 30% higher than spring populations, assuming reproductive success of 50%, production of 4 chicks per successful hen, and 25% chick survival to fall (Schroeder 2000b). Nonetheless, past harvest rates in Washington greatly exceeded 10% of the estimated spring population in some years. For example, in 1954, an estimated 2,700 birds were killed in Kittitas County, when the statewide breeding population may have been around 9,000 birds; 3,300 hunters killed an estimated 2,065 birds in 1970 when the total spring population may have been only about 3,800 birds (Hays et al. 1998). Excessive harvest occurred in part because it was assumed that hunting mortality of less than 30% of the population was compensatory (Autenrieth et al. 1982). Also, harvest was assumed to be more or less self-limiting by what Leopold (1933) called the "law of diminishing returns," meaning that hunters would stop hunting when game became scarce.

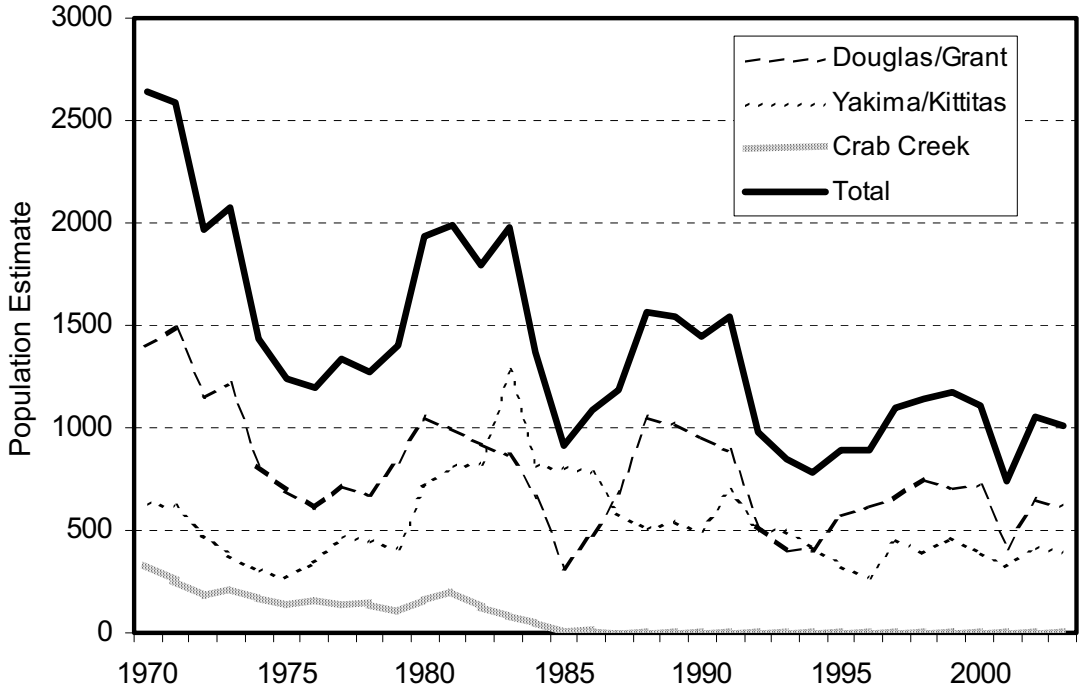

Figure 3. Estimated breeding population of greater sage-grouse in Washington, 1970–2003.

Despite statewide closure of the season in 1988, the sage-grouse population stayed at low levels or continued to decline (Fig. 3), probably due to the dramatic reduction in habitat, deterioration and fragmentation of the remaining habitat, and isolation and small size of the remaining populations.

Current Status

Sage-grouse have survived in Washington largely because portions of the land in Douglas County are poorly suited to agriculture, and in part because U.S. Army ownership of the YTC prevented agricultural conversion and most other development. The statewide breeding population of sage-grouse in Washington in 2003 was conservatively estimated to be approximately 1,011 birds in two populations: about 624 birds in the Douglas-Grant counties population and 387 birds in Kittitas-Yakima counties population on the YTC (Fig. 4). These populations are separated by about 50-60 km. The statewide breeding population declined from about 1,080 birds in 2000 to 730 birds in 2001, but seemed to rebound to 1,059 birds in 2002 (Schroeder, unpubl.data). These figures are probably underestimates. The Yakima-Kittitas population estimate ranged from 166-421 birds during 1989-2002 and averaged 306 birds (U.S. Army 2002). Although the Yakima-Kittitas population has fluctuated over the years, the average estimate is higher for the most recent 7 year period (326 for 1996-2002; 285 for 1989-95). The average annual percent change (+6.84%) indicates a slight increase overall since 1989 (U.S. Army 2002).

Based on occasional sightings, a few scattered sage-grouse may occur on the periphery of the current range but are not believed to play a significant role in the dynamics of the populations. Most of the lek complexes (49 of 68; 72.1%) that were active at least 1 year from 1960 - 2001, are now vacant (Fig. 4). Just over half (26 leks) of these vacant leks are outside the current range, while the remainder (23)

livestock management over the last 150 years would seem to be more pertinent that speculations about prehistoric grazing regimes.

Native grasses and forbs in shrub-steppe do not seem to be adapted to intensive grazing by ungulates (Mack and Thompson 1982). Perennial bunchgrasses in the Columbia Basin grow rapidly in the spring to set seed before summer drying. Heavy spring grazing can prevent the plants from reproducing and can eventually eliminate the native bunchgrasses (Mack and Thompson 1982). Grazing by large herds of livestock after 1850 had a profound effect on the shrub-steppe ecosystem, greatly reducing the understory species of grasses and palatable forbs (Daubenmire 1940, Daubenmire and Colwell 1942, Ellison 1960, Galbraith and Anderson 1971, Tisdale and Hironaka 1981, Mack and Thompson 1982, Elmore and Kaufman 1994, Fleischner 1994). Shear (*in* Mack 1981) reported in 1901 that "bunchgrasses have been practically exterminated over large areas and their places occupied more or less by weedy annual plants, especially the soft chess" (*Bromus mollis*). Some of the most palatable bunchgrasses, such as Idaho fescue, may have declined in abundance, while less palatable species, like Sandberg bluegrass, probably increased in abundance (Rickard 1985; J.Benson, pers. comm.). Affected areas were then invaded by various aggressive, less-palatable species, especially introduced cheatgrass (*Bromus tectorum*) (Pickford 1932, Stewart and Hull 1949). Lowered water tables in meadow areas and erosion also resulted (Cottam and Stewart 1940, West 1983). By the 1930's, federal range personnel estimated that 84% of the sagebrush-grass region in the United States was severely depleted (USDA 1936).

Heavily grazed sites may have an understory of introduced annual grasses, like cheatgrass and crested wheatgrass (*Agropyron cristatum*), little forb cover, and little or no moss and lichen cover (Crawford and Kagan 2001). Many sites that have had repeated or intense disturbance are dominated by cheatgrass. Additional weed species that have invaded are medusahead (*Taeniatherium caput-medusa ssp. asperum*), rush skeletonweed (*Chrondilla juncea*), yellow starthistle (*Centaurea solstitialis*), and knapweeds (*Centaurea* spp.). The normal fire return interval for Washington shrub-steppe communities is uncertain, but was likely 50-125 years in Wyoming big sagebrush types, the most widespread communities (Scharf 2002, Wambolt et al. 2002). Fires result in the promotion of cheatgrass (Whisenant 1990, Peters and Bunting 1994), and cheatgrass also facilitates fire by providing a highly combustible, continuous fuel blanket, resulting in more intense and frequent fires that can eliminate sagebrush. Crawford and Kagan (2001) summarized: "alteration of fire regimes, fragmentation, livestock grazing, and the addition of >800 exotic plant species have changed the character of shrub-steppe habitat." More than half of the shrub-steppe community types in the Pacific Northwest are listed as imperiled or critically imperiled in the National Vegetation Classification published by The Nature Conservancy (Anderson et al. 1998).

Agricultural expansion, overgrazing, and sagebrush control through burning, mechanical removal, and herbicides severely degraded sage-grouse habitat. The combination of agricultural expansion and horses used in farming operations caused the most serious damage and deterioration to eastern Washington's shrub-steppe in the late 1800s and early 1900s (Harris and Chaney 1984). The Homestead Act of 1862 led to the proliferation of small farms in eastern Washington between 1863 and 1910 (Harris and Chaney 1984), and burning and plowing of shrub-steppe for agriculture became widespread (Yocom 1956). Nearly all of the conversion of shrub-steppe habitat to dryland farming occurred prior to 1940. After 1950, habitat was converted to irrigated farming as a result of large-scale reclamation projects associated with construction of the Columbia and Snake River dams.

Present

An estimated 7.4 million acres of steppe vegetation types remain in Washington (Jacobson and Snyder 2000). This is about 50% of the estimated 15 million ac of steppe habitats that existed in eastern

Table 7. Existing cover type[a] on lands in current and historical sage-grouse range in Washington (Schroeder et al. 2000).

Portion of Sage-grouse range	Proportion of area dominated by cover type (%)				Total area (km^2)
	Steppe habitats[b]	Cropland	CRP	Other	
Current sage-grouse range	57.0	26.6	13.0	3.4	4,683
Douglas-Grant County population	44.3	35.1	16.7	3.9	3,529
Yakima/Kittitas (YTC) population	95.6	0.5	1.9	1.9	1,154
Historical sage-grouse range[c]	43.5	41.5	6.1	8.9	57,741

[a] Based on 1993 Thematic Mapper Landsat data (Jacobson and Snyder 2000); current CRP percent would be higher and cropland lower for Douglas-Grant County.
[b] Includes shrub-steppe, meadow-steppe, and steppe habitats described by Daubenmire (1970).
[c] Cover types now present on the total area once occupied by sage-grouse in Washington.

Washington before European settlement. Most of the shrub-steppe lost was converted to cropland, but smaller amounts have been lost to roads, residential and commercial development, or inundation by reservoirs (Table 7). Within the historical sage-grouse range in Washington, approximately 25,117 km^2 (6,203,982 acres, 44%) of steppe habitats remain. Sage-grouse habitat is a subset of this remaining acreage, and factors affecting suitability include the type and percentage of shrub cover, elevation, slope, soil type, size of shrub-steppe patch, and habitat quality. Concurrently, there has been a 90-92% reduction in the distribution of sage-grouse. Swenson et al. (1987) also observed a disproportionate decline (73%) in sage-grouse when 16% of their Montana study area was converted to grain production.

Much of the most productive shrub-steppe with deep soil has been converted to agriculture, and what remains has steeper slopes, and/or has shallow rocky soil (Vander Haegen et al. 2000). Nearly all of it has been degraded to some degree; the worst is in poor condition and dominated by cheatgrass (Vale 1975, Mack 1981, Mack 1986, Dwire et al. 1999). More than 42% of the land classified as shrub-steppe has <10% shrub cover, either due to fires or because it is a grass-steppe vegetation type (Jacobson and Snyder 2000), and is generally not suitable for sage-grouse. Even where shrub-steppe with >10% shrub cover remains, often the understory of bunchgrasses and forbs has been degraded by historical overgrazing so that it is unsuitable for sage-grouse breeding and may only be suitable for wintering.

Three of the largest blocks of remaining shrub-steppe occur on the U.S. Army's YTC in Yakima and Kittitas counties, on and around the Hanford Department of Energy site in Benton County, and the Yakama Reservation (Dobler et al. 1996). The population in Douglas-Grant counties is supported by a mix of shrub-steppe remnants, CRP, and croplands.

Yakima Training Center. The YTC is a 327,242 ac facility used for military training exercises where 241,000 ac are still vegetated with sagebrush communities and of which about 145,000 ac can potentially support the big sagebrush/bluebunch wheatgrass habitat type (Livingston 1998, ENRD-YTC 2002). Based on radio telemetry relocations, sage-grouse occupy about 124,000 ac (38%) of the YTC (Livingston and Nyland 2002). The YTC was grazed from 1960-1995. The grazing program was initiated to reduce fuel and fire risk, but damaged sage-grouse habitat, increased the area dominated by cheatgrass and weeds, and did not seem to reduce fire frequency (Livingston 1998, M. Pounds, pers. comm.). Most of the 200 springs on the YTC were

aside from any potential as habitat for resident populations of sage-grouse. The Colockum and Potholes units have potential to link the current Douglas-Grant and YTC populations of sage-grouse. This linkage would be particularly important in maintaining the long-term genetic health of sage-grouse in Washington. Unfortunately, both of these units have severe limiting factors such as quality of winter and breeding habitat. The Colockum Unit, which contains substantial portions of WDFW and DNR lands, appears to offer the best potential to connect the Moses Coulee and YTC units. However, it is handicapped by relatively rugged terrain, much of which may be unsuitable for sage-grouse. In contrast, the Potholes Reservoir has suitable topography but has numerous deficiencies in habitat and is an imperfect corridor between northern and southern populations. The Columbia River may inhibit movements of birds into the Potholes unit from currently occupied areas. Interstate 90 may inhibit north-south movements to some extent. Although full grown sage-grouse can easily fly over the highway corridor, it is uncertain if they will readily do so. The northeastern portion of the Rattlesnake Hills unit, particularly Umtanum Ridge, may provide an important movement corridor between the YTC and Hanford units. Sightings of sage-grouse on the Hanford unit since 1998 may result from birds moving out of the YTC (L. Cadwell, pers. comm.).

Habitat Limitations. Several factors limit sage-grouse populations or prevent habitat from being re-occupied. These include the quality of habitat present, the quantity of breeding and wintering habitat, isolation from occupied habitat, and the general health of existing sage-grouse populations. The quantity and quality of breeding habitat limits the expansion and recovery of sage-grouse in all management units. Some units, including Colockum, Umtanum Ridge, Bridgeport Point, Rattlesnake Hills, Saddle Mountains, Potholes Reservoir, and Hanford may currently have insufficient quality or quantity of breeding habitat and will require restoration to support breeding populations.

Sage-grouse are absent from many areas in Washington that contain limited amounts of winter and breeding habitat in adequate condition. Habitat patches are too small and too isolated from other patches to support a population that can persist for very long. There may also be unoccupied areas in Washington that contain an adequate quantity of breeding and winter habitat but lack sage-grouse simply due to isolation from source populations. This may include the Toppenish Ridge unit which is currrently being analyzed for its capability to support a population. The lack of habitat corridors is becoming a more critical problem every year as occupied habitat becomes more fragmented and isolated. Although the lack of winter habitat is not believed to be a significant factor in the declines of sage-grouse in currently occupied areas, the lack of sagebrush in some areas may reduce the opportunities for population recovery. Management units lacking or with a low amount of wintering habitat include Bridgeport Point, Colockum, Crab Creek, Hanford, Potholes Reservoir, Saddle Mountains, and Umtanum Ridge.

CONSERVATION STATUS

Legal Status

Sage-grouse were listed as threatened by the Washington Fish and Wildlife Commission in 1998 after becoming a state Candidate species in 1991 (Hays et al. 1998). Sage-grouse are classified as a game species in Washington and were formerly hunted. The hunting season was closed in 1988. Sage-grouse are designated a priority species and their habitat designated a priority habitat by the WDFW Priority Habitats and Species (PHS) program. Sage-grouse are not protected under the federal Migratory Bird Treaty Act and jurisdiction has been the responsibility of states.

In response to a petition to list the Washington population of sage-grouse under the U.S. Endangered Species Act, the U.S. Fish and Wildlife Service determined in May 2001 that listing the

other prairie grouse are reported to avoid areas with tall structures even where anti-perching devices prevent raptors from using the tower or pole as a hunting perch (Manes et al. 2002). In California, sage-grouse abandoned leks within 1.4 mi of new powerlines and lek attendance was reduced up to 3 mi away (Rodgers 2003; F. Hall, pers. comm.). This avoidance may be an instinctive response to tall structures that reduces the bird's vulnerability to avian predators. In radio-telemetry studies, prairie chickens avoided suitable habitat within ½ mi of residences, well-traveled roads, and compressor stations, and none of the 200 marked birds nested or were ever located within 1 mi of a coal-fired generating station (Robel 2002). Robel (2002, R. Robel, pers.comm.) predicts that prairie-chickens will not nest or rear broods within at least 1 mile of wind turbines which will render otherwise suitable habitat unusable. If this holds true for sage-grouse, the Maiden project may render 43 mi^2 of sage-grouse recovery area, including 5 mi^2 of shrub-steppe on the ALE unit of the Hanford Reach National Monument, unusable for breeding. The EIS outlines a plan to mitigate for only 414 ac of native habitat permanently or temporarily impacted by the project at a ratio of 3:1 (BPA 2002a). The Maiden project location is also problematic to sage-grouse recovery because it has the potential to inhibit movements of birds between the YTC, the Hanford unit, and the Toppenish Ridge unit, where a study is evaluating the feasibility of reintroduction of sage-grouse. If sage-grouse will not breed near wind towers, then the likelihood of expansion of populations into the other units from the YTC is reduced.

The second wind project located within the Recovery Area is the Wild Horse project, which proposes to erect 100 turbines near Whiskey Dick Mountain east of Ellensburg in the Colockum Sage-grouse Management Unit. The Colockum is an important corridor for grouse to potentially move between the YTC and Douglas-Grant populations.

Grassland nesting passerines, waterfowl, and wading birds are also known to avoid wind turbines (Winkelman 1990, Leddy et al. 1999). It is not known if birds avoid the vicinity of turbines due to disturbance from noise, motion, or human activity, or if the area is avoided because tall structures are perceived as potential raptor perches. Noise that can disrupt mating communication may also be a factor for lekking species.

Powerlines, Fences and Roads

The concerns about behavioral avoidance of wind turbines are also true about electrical transmission lines and any other tall structures. There are no leks near major transmission lines in Douglas County or on the YTC. Leks in California and Nevada disappeared within 1.4 mi after a new transmission line was erected and lek attendance declined within 2-3 miles. Smaller distribution lines that do not have tall towers may primarily be a concern as a collision hazard. Powerlines, wire fences, and roads are all known to cause sage-grouse mortalities. All of these structures fragment and degrade sage-grouse habitat and make it more hazardous for sage-grouse to move within otherwise suitable habitat and between habitat patches.

Habitat Fragmentation

In addition to the issues of demographic and genetic isolation, habitat fragmentation creates or exacerbates other impacts to sage-grouse. This includes increased predation in habitat patches (Schroeder and Baydack 2001), increased potential for encroachment by noxious weeds, and increased impacts of herbicides and insecticides sprayed on adjacent cropland.

CRP and Habitat Security on Private Lands

Sage-grouse in Douglas County are dependent upon private lands, but agriculture is the major land use and brush control and shrub-steppe conversion continue. The federal candidate status of sage-grouse strained relations with some landowners due to fears of regulation, but benefitted many landowners applying for enrollment in the Conservation Reserve Program (CRP). The

Douglas County which encompasses most of the Moses Coulee and Mansfield Plateau management units is now at the maximum allowable acreage for CRP (33.3% of cropland). Much of the CRP fields have been enrolled for more than 12 years and are beginning to resemble native shrub-steppe habitat in structure. The YTC population has increased somewhat in recent years, but it is not known if this is a result of habitat improvements since the cessation of grazing (M. Pounds, pers. comm.), increased survey efforts, or some other factor. Some management units will require substantial restoration efforts in order to support breeding and wintering populations. Table 10 provides a preliminary summary of the current and predicted potential functions of the 14 management units (Fig 5).

Table 10. Current and potential functions of 14 Sage-Grouse Management Units in eastern Washington.

	Current function[a]		Potential functions			
Management unit	Breeding & winter		Reintroduction/ breeding[b]	Secondary breeding[c]	Corridor/ connectivity[d]	Seasonal use[e]
Ahtanum Ridge				✔	✔	✔
Bridgeport Point				✔		✔
Colockum			?	✔	✔	✔
Crab Creek			✔			✔
Dry Falls			?	✔	✔	✔
Hanford			✔	✔	✔	✔
Mansfield Plateau	✔					✔
Moses Coulee	✔					✔
Potholes Reservoir				✔	✔	✔
Rattlesnake Hills				✔	✔	✔
Saddle Mountains				✔	✔	✔
Toppenish Ridge			✔			✔
Umtanum Ridge				✔	✔	✔
Yakima Training Center	✔					✔

[a] Currently occupied units include core breeding and wintering areas.
[b] Potential areas for reintroduction to establish breeding populations, but habitat needs to be evaluated and may require restoration before a population can be established; **?** = units where potential for reintroduction is probably low.
[c] Areas that may support limited breeding.
[d] Primary importance is for providing habitat connections for movement corridors between breeding areas and between seasonally used areas.
[e] Areas likely to be used seasonally during winter, summer, or fall; may or may not support nesting.